**REMARKS**

The above-noted amendments to claim 12 are respectfully submitted in order to clarify the subject matter of the present invention.

Claims 12-18 and 20 have been rejected as being unpatentable over Smallbone (U.S. Patent No. 5,627,874) in view of Hall (U.S. Patent No. 6,072,853) under 35 U.S.C. § 103(a). The Examiner contends that Smallbone discloses apparatus for analyzing a stream of particulate material-containing substances including means for extracting a sample flow from the stream of particulate material, means for smoothing and flattening a surface of the sample flow, a measurement station including an X-ray generator and position sensitive detector for detecting X-ray patterns from the prepared sample flow, processor means for analyzing the X-ray patterns to determine a composition for substances in the sample from each pattern and to provide a series of sequential composition determinations, thereby representing the composition of substances in the stream of particulate material.

The Examiner admits that Smallbone does not disclose a measurement station including an X-ray generator and position sensitive detector for detecting X-ray diffraction patterns and processing means for analyzing the X-ray diffraction patterns to determine a composition for crystalline substances in the sample from each diffraction pattern, and that Smallbone is concerned with fluorescence. The Examiner, however, cites Hall as disclosing a measurement station including an X-ray generator and position sensitive detector for detecting X-ray diffraction patterns, and contends that it would be obvious to modify Smallbone to include an X-ray generator and position sensitive detector for detecting X-ray diffraction patterns.

Regarding claims 13 and 14, the Examiner admits that Smallbone does not disclose the position sensitive detector of

the measurement station is curved for simultaneously detecting diffracted X-rays over an angular range or that it is an area detector. However, the Examiner contends that Smallbone discloses various types of detectors depending on the intent of the analysis, and concludes that it would be obvious to modify Smallbone to employ a curved position sensitive detector or an area detector is it is desired to perform composition analysis of crystalline substances.

With respect to claim 15, the Examiner contends that Smallbone discloses the means for smoothing and flattening a surface of the sample flow which includes a carrier to receive extracted sample flow with the carrier being driven for continuous movement, whereby the means for smoothing and flattening operates on the carrier as it moves, and prior to the carrier conveying the sample flow through the measurement station.

With respect to claim 16, the Examiner contends that Smallbone discloses the carrier including an endless groove, and means for smoothing and flattening the surface of the sample packs the sample into the groove.

As for claim 17, the Examiner admits that Smallbone does not disclose means for smoothing and flattening the surface being a driven roller positioned over the endless groove, but contends that Smallbone discloses the means for smoothing and flattening is a sample compactor positioned over the endless groove. The Examiner contends that it would be obvious to modify Smallbone to employ a driven roller instead of a sample compactor since they are said to functionally equivalent means to smooth and flatten the surface.

As for claim 18, the Examiner contends that Smallbone discloses means for removing excess sample from the carrier prior to the means for smoothing and flattening the surface.

Finally, with respect to claim 20, the Examiner contends that Smallbone discloses the carrier is formed for the sample to be removed or the apparatus includes means for removing the sample prior to where the carrier received the extracted sample flow after and after the sample passes the measurement station.

These rejections are respectfully traversed in view of the above amendments and arguments and for the reasons set forth hereinafter.

It is initially applicants' position that the Examiner has misinterpreted the Smallbone reference, as well as the nature of the present claims. Indeed, it is applicants' position that claim 12, even before the above-noted amendments, is specifically directed to a process in which a "sample flow," which is by definition continuous is nature, is prepared for X-ray diffraction measurements, and that this continuous sample flow is conveyed through a measurement station. In order to exemplify this point, however, claim 12 has been amended to refer to a "continuous" sample flow. It is therefore believed that claim 12, both before and after these amendments, clearly distinguishes over Smallbone, which does not provide any apparatus which is even capable of continuous measurement of any form of X-ray, and certainly not X-ray diffraction measurements.

Turning to the Smallbone reference itself, in accordance with this patent, and as shown in Figures 1 and 1A thereof, a stream of sample from the main product enters the sample inlet chute 501 at the top "X" shown in Figure 1, and in this manner overfills the windowless sample cell 502. This cell itself is mounted on a sample transporter 514. In this manner, at various intervals the cell 502 is transported on carriage 514 from position III to analysis positions IV and V. Excess sample is removed during this movement by the sample compactor 503, which compresses the remaining sample therein. As the cell

reaches position IV, X-ray shutters 55 have, in turn, moved from beneath the X-ray analyzers 507 and 508. Thus, as shown in Figure 1A, the sample cell has moved to its far left position. Subsequent to the measurements then being taken, the sample cell then returns to its original position at chute 501, where it is inverted to discharge the sample therefrom. The sample cell itself can then return to its horizontal position for further sampling and collection in accordance with the above discussion.

It is therefore clear from the disclosure in Smallbone that the apparatus shown in that patent is specifically intended to collect a finite amount of sample from the main stream in inlet chute 501 into the cell 502, and to then remove the sample through the horizontal position shown in Figures 1 and 1A and discussed above. Subsequent finite amounts of sample can then be collected only after each of these procedures has been completed. The reciprocating movement of the sample cell 502 disclosed in Smallbone can thus be vividly contrasted to the claimed apparatus of the present invention. Thus, the apparatus in Smallbone is entirely incapable of analyzing a continuous stream of particulate material, or of providing means to smooth and flatten the surface of the continuous sample flow to prepare it for X-ray diffraction measurement, or to analyze the X-ray diffraction patterns to represent the composition of the crystalline substances in a continuous stream of particulate material. Again, none of this is possible with the apparatus disclosed in Smallbone. On the other hand, the claimed apparatus hereof allows for extremely rapid sequential composition determination, thus providing for virtually continuous analysis, particularly as compared to the prior art, such as Smallbone.

The combination of Smallbone with Hall clearly does not overcome these deficiencies, particularly since Hall in no way suggests the overall apparatus of the present invention.

Indeed, Hall is merely cited for its disclosure of X-ray diffraction measurement techniques to determine the composition of various substances, including cements. Thus, even if it were somehow considered to be proper to combine Smallbone with Hall, none of the above-noted deficiencies of Smallbone with respect to claim 12 would be realized. It should also be noted, as the Examiner admittedly realizes, that Smallbone does not teach any apparatus which is capable of measuring X-ray diffraction patterns from any sample, including a crystalline sample. The requirements for sample preparation for X-ray fluorescence are clearly not the same as those for X-ray diffraction, particularly since the latter requires far more precise preparation. Thus, the sample preparation techniques disclosed in Smallbone would not be applicable to X-ray diffraction measurements in the first instance. Furthermore, there is no motivation in Smallbone, or in Hall for that matter, to replace X-ray fluorescence with X-ray diffraction.

With respect to dependent claims 13-18 and 20, it is at least initially clear that each of these claims is also fully patentable over the cited art for at least those reasons expressed above. With respect to claims 13 and 14, for example, the Examiner essentially admits that there is a failure of the prior art, including Smallbone, to refer in any way to the specific position sensitive detector being a curved position sensitive detector and/or an area detector. In view of the above comments with respect to the utter failure of Smallbone and/or Hall to teach the apparatus of claim 12, it is even clearer that claims 13 and 14 are fully patentable thereover. Similarly, claim 15 specifies that the carrier is drivable for continuous movement, which is clearly not suggested by Smallbone and its reciprocating intermittent movement. There is no apparatus in Smallbone which includes an endless groove as required by claims 16 and 17, or the use of a driven roller

positioned over the endless groove thereof. Similarly, claim 18 depends from claim 17 and includes all of the limitations thereof, and claim 20 depends from claim 15 and includes the limitations of that claim. Therefore, it is apparent that all of these claims are fully patentable over the cited art.

Claim 23 has been rejected as being unpatentable over Smallbone under 35 U.S.C. § 103(a). The Examiner contends that Smallbone discloses apparatus for presenting a sample from a stream of particulate material for X-ray measurements which includes each of the claimed elements. Indeed, the Examiner contends that Smallbone discloses all of the claimed elements except for the fact that the apparatus is for X-ray diffraction measurements, but contends that it would be obvious to modify Smallbone in this regard. This rejection is respectfully traversed in view of the above amendments and arguments and for the reasons set forth hereinafter.

While applicants once again submit that claim 23 in its prior form is clearly distinguishable from Smallbone, in order to further clarify this claim, applicants have amended this claim to require that the carrier be drivable for continuous unidirectional movement. Once again, this can be clearly contrasted with the Smallbone disclosure of interrupted reciprocating movement between horizontal positions, as is discussed in detail above. Once again, and for at least the reasons set forth above, it is equally clear that claim 23 defines patentable subject matter over the Smallbone reference, and withdrawal of this rejection and allowance of this claim is also respectfully solicited.

It is therefore respectfully submitted that all of the claims in this application now possess the requisite novelty, utility and unobviousness to warrant their immediate allowance, and such action is therefore respectfully solicited. If, however, for any reason the Examiner does not believe that such

action can be taken at this time, it is respectfully requested that he/she telephone applicant's attorney at (908) 654-5000 in order to overcome any additional objections which he might have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

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Respectfully submitted,

By 

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